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use and to help prevent the handle from being opened during normal use of the prosthesis, the radially-protruding portion of the handle and of the base may be adapted to point the same direction when the handle is in the closed position. The radially-protruding portion of the handle may be angularly distanced from the radially-protruding portion of the base when the handle is in the open position. Preferably, the valve device does not comprise a spring.

Certain embodiments may be described as a pressure-control valve device for a prosthetic hard socket, the valve device including a manual two-way valve system comprising: a housing comprising a base for attachment to a prosthetic hard socket, and a handle movably connected to the base, wherein each of the base and the handle comprises an air-flow bore; and wherein the handle is movable to an open position wherein the air-flow bore of the handle is in fluid communication with the air-flow bore of the base so that air flows all the way through the valve device between a front end and a rear end of the valve device. For example, the handle may be generally coaxial with the base and rotate relative to the base on a longitudinal axis of the valve device to said open position. In other words, the handle may be movable in various ways, including but not necessarily limited to rotation relative to the base. In embodiments comprising handle rotation, the handle may rotate relative to the base on said longitudinal axis to move to a closed position wherein the air-flow bore of the handle is not in fluid communication with the air-flow bore of the base so that air does not flow between the front end and the rear end of the valve device. An air-seal is preferably provided around a front end of the air-flow bore of the base, the air-seal sealing against the handle when the handle is moved to the closed position, so that ambient air does not enter the air-flow bore of the base from the front of the base. An automatic one-way expulsion valve member may be provided in addition to the manual valve, to allow the valve device to serve multiple purposes to optimize pressure control inside the socket well. The one-way expulsion valve may be installed in the housing to automatically open when air pressure at a rear end of the expulsion valve member reaches a certain differential pressure above pressure at a front end of the expulsion valve, whereby air flows through the valve device when the manual two-way valve system is closed. Typically, the rear end and front end of the expulsion valve member will be in fluid communication with the rear and the front of the entire valve device, respectively, to provide a second way (in addition to the manual valve) for air flow out of the socket well, with the one-way system typically being for quiet and repeated air expulsion during walking and running. The preferred elastomeric valve member is an umbrella valve.

Although this invention has been described above with reference to particular means, materials and embodiments, it is to be understood that the invention is not limited to these disclosed particulars, but extends instead to all equivalents within the broad scope of the following claims.

The invention claimed is:

1. A pressure-control system for a prosthetic hard socket, the pressure-control system comprising:

a prosthetic socket comprising a wall defining a space for receiving a residual limb, the space comprising a well between the lower end of the limb and the lower end of the socket, wherein a hole extends through said wall in the vicinity of the well; and

a valve device comprising:

a housing comprising a base at a rear end of the valve device and connected to the socket wall at the hole, and a handle at a front end of the valve device and rotatably

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connected to the base, wherein each of the base and the handle comprises an axial bore; and

wherein the handle is rotatable to an open position wherein the axial bore of the handle is aligned with the axial bore of the base so that the axial bores form an air passageway between the front and rear of the valve device for air-flow from the socket well to the ambient atmosphere outside the socket and air-flow from said ambient atmosphere to the socket well;

wherein the handle is rotatable to said open position on a longitudinal axis, both the axial bore of the handle and the axial bore of the base are radially offset from said longitudinal axis, and the handle is rotatable relative to said base on said longitudinal axis to a closed position wherein the axial bore of the handle is angularly distanced from the axial bore of the base to block said air passageway.

2. A pressure control system as in claim 1, wherein the valve device comprises an o-ring around the front end of the axial bore of the base, wherein said o-ring seals against a rear surface of the handle when the handle is in the closed position, so that ambient air is prevented from flowing into said axial bore of the base.

3. A pressure-control system as in claim 1, wherein said handle rotates in the range of 30-90 degrees between the open position and the closed position.

4. A pressure-control system as in claim 3, wherein the valve device comprises a perimeter wall around a portion of the handle extending axially along-side a portion of the base, wherein an end of the wall abuts into the base to stop rotation of the handle relative to the base when the bores of the handle and base are aligned.

5. A pressure-control system as in claim 3, wherein the base and the handle each comprises a radially-protruding portion, and the radially-protruding portions of the handle and of the base point in the same direction when the handle is in the closed position.

6. A pressure-control system as in claim 5, wherein the radially-protruding portion of the handle is angularly distanced from the radially-protruding portion of the base when the handle is in the open position.

7. A pressure-control system for a prosthetic hard socket, the pressure-control system comprising:

a prosthetic socket comprising a wall defining a space for receiving a residual limb, the space comprising a well between the lower end of the limb and the lower end of the socket, wherein a hole extends through said wall in the vicinity of the well; and

a valve device comprising:

a housing comprising a base at a rear end of the valve device and connected to the socket wall at the hole, and a handle at a front end of the valve device and rotatably connected to the base, wherein each of the base and the handle comprises an axial bore; and

wherein the handle is rotatable to an open position wherein the axial bore of the handle is aligned with the axial bore of the base so that the axial bores form an air passageway between the front and rear of the valve device for air-flow from the socket well to the ambient atmosphere outside the socket and air-flow from said ambient atmosphere to the socket well; wherein:

the handle is rotatably connected to the base portion by encircling a one-way valve housing portion that is connected to the base portion, and wherein the one-way valve housing portion has a central-bore; and the valve device further comprises an elastomeric valve member having a rear end retained in the one-way